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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/762,984	01/21/2004	G. Paul Koning	EQLC-P01-003	5998

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FISH & NEAVE IP GROUP
ROPES & GRAY LLP
ONE INTERNATIONAL PLACE
BOSTON, MA 02110-2624

EXAMINER

DOAN, DUC T

ART UNIT	PAPER NUMBER
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2188

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/21/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/762,984

Applicant(s)

KONING ET AL.

Examiner

Duc T. Doan

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 February 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10,12,14-21 and 23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10,12,14-21 and 23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>9/6/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Status of Claims

Claims 1-24 have been presented for examination in this application. In response to the last office action, claims 1,12,14,23 have been amended, claims 11,13,22,24 have been canceled.

As the result, claims 1-10,12,14-21,23 are pending in this application.

Claims 1-10,11-12,14-21,23 are rejected.

Applicant's remarks filed 2/12/07 have been fully considered but they are not persuasive. Therefore, the rejections from the previous office action are respectfully maintained, with changes as needed to address the amendments

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-10,12,14-21,23 rejected under 35 U.S.C. 103(a) as being unpatentable over Mashayekhi et al (US 2003/0074596) and in view of Umberger et al (US 6957433), and further in view of Blumenenau et al (US 2004/0080558), Aditya et al (US 6122681).

As in claim 1, Mashayekhi describes an apparatus for resource migration, comprising a storage system having a plurality of storage servers (Mashayekhi's Fig 1: #17) with a set of resources partitioned thereon (Mashayekhi's Fig 1: #16, #15), the claim further recites said storage servers having a load monitor process capable of communicating with other load monitor processes for generating a measure of loading on respective ones of the plurality of servers; a resource migration process for transferring a resource from one of said plurality of servers to another of said plurality of servers in response to said measure of loading. Mashayekhi does not describe the claim's detail of the server's processes. However, Umberger describes the storage systems (Umberger's Fig 5: #502A-#502N, correspond to the claim's storage servers) with multiple service components (Fig 5: #301-305) capable of measuring the service demands on workloads in the storage system (column 5 lines 35-63), and using the utilization information of storage systems to determine migrating the workload, for example from the high utilizing storage system to the low utilizing storage system (Umberger's column 9 lines 2-20; column 35-52). It would have been obvious to one of ordinary skill in the art at the time of invention to include the service components and procedures as suggested by Umberger in Mashayekhi's system to measure the incoming work request rates and calculating the utilization of components in a storage system thereby allowing dynamically balancing the workloads among the storage systems thus further optimize the performance of the overall system (Umberger's column 8 line 63 to column 9 line 20). The claim further recites a write-detect process which detects when a resource write request applied to a resource that is in the process of being moved from a first server to a second server, and which in response to such resource write request writes copies of the resource to both of said first and second server. Mashayekhi and Umberger do not expressly

disclose the claim's step of writing to both source and target servers. However, Blumenau discloses an online migration method/process for storage resources being distributed in an environment such as database, file system applications. Blumenau further discloses while the migration process is in progress, any write request that applies to a resource that is being moved, causes a write operation being issued to both source and target volumes. It would have been obvious to one of ordinary skill in the art at the time of invention to include the online migration processes as suggested by Blumenau in Mashayekhi's system in which the write request is sent to both the source and target volume thereby the consistency of data in the source and target volume can be tracked and preserved if one of the server is crashed (see Blumenau's paragraphs 40,42-45); and

Mashayekhi, Umberger and Blumenau do not expressly disclose the claim's details of responding to a write failure. However, Aditya discloses a retry mechanism and apparatus including in response to the receiving server failing to receive data sent from the sending server, the sending server retries/sends data again to ensure the request 's data is propagated to the receiving server (Aditya's column 2 line's 7-26). It would have been obvious to one of ordinary skill in the art at the time of invention to include the retry mechanism and apparatus as suggested by Aditya in Mashayekhi's system such that the retry can be done for data transferring at a lower level in an efficiently manner (i.e transmitting frames at physical layer; Aditya's column 4 lines 27-48), thereby further improve the overall data throughput of the system (Aditya's column 3 lines 60-65).

As in claim 2, the claim recites wherein said servers are equivalent to each other. Mashayekhi further describes the servers A, B are operated in an equally manner to provide data

to the initiator as separate nodes of servers in a cluster group (Mashayekhi 's page 3 paragraph 23)

As in claim 3, Mashaekhi does not expressly disclose the claim's detail of resources. However, Umberger further discloses said resources are selected from the group consisting of data blocks, program files, multimedia files, applications, and database files. Umberger's column 8 lines 20-38 describe the work requests as an example for data blocks stored in a RAID storage system in a storage area network environment (SAN).

As in claim 4, Mashaekhi does not expressly disclose the claim's detail corresponding to loading. However, Umberger further discloses the storage systems (Umberger's Fig 5: #502A-#502N, correspond to the claim's storage servers) with multiple service components (Fig 5: #301-305) capable of measuring the service demands on workloads in the storage system (column 5 lines 35-63; corresponding to the claim's measure of loading reflects overall storage system), and using the utilization information of storage systems to determine migrating the workload, for example from the high utilizing storage system to the low utilizing storage system (Umberger's column 9 lines 2-20; column 35-52; corresponding to the claim's measure of loading reflects a server load).

As in claims 5-7,10 Mashayekhi 's does not expressly disclose the claims' details associating with the storage system. However Umberger describes the claims' limitations as follows:

As in claim 5, Umberger's column 8 lines 35-40 describe wherein said storage system is a Storage Area Network.

As in claim 6, Umberger describes wherein the load monitor includes a process to determine whether a server is servicing a disproportionate share of the client requests being handled by a server group (Umberger's column 9 lines 10-20).

As in claim 7, Umberger discloses the resource migration process includes a block data migration process. Umberger's column 8 lines 20-32, column 9 lines 10-20 describe as an example the migration of data for data blocks stored in a RAID of storage systems in a storage area network environment (SAN).

As in claim 8, Umberger discloses including a routing table for tracking resources maintained on the system. The claim rejected based on the same rationale as of claim 1. Blumenau's paragraph 48 discloses various information such as states of copying operations, location of source and target resources must be kept track in order for a recovery process and to make the source and target data being consistency. Thus it's obvious the server #101 must employed data structures such as tracking tables to point to the locations of the source and target resources that are being located/ distributed all over a network.

As in claim 9, Umberger discloses a pointer to a resource is maintained during an access operation to provide continuous data access. The claim rejected based on the same rationale as of claim 8. Blumenau's paragraph 79 further describes that the resources being migrated during online migration method are being tracked and pointed to using well known techniques for examples pointers to blocks of data, files, volumes.

As in claim 10, Umberger discloses the load monitoring process monitors one or more of network traffic load, I/O request load, storage traffic pattern type. Umberger describes the

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workload metric collector gathering the service demands rate (Umberger's column 5 lines 50-62).

As in claim 12, Umberger discloses the resource migration process divides the resource being moved into smaller subresources, such that each subresource is moved from a first server to a second server in turn, and recovery from failure requires only the recovery of the subresource being moved at the time of failure and subsequent subresources. The claim is rejected based on the same rationale as in the rejection of claim 1. Blumenau further discloses the migration process is being done in smaller subresources such as a data block, a number of data blocks (see Blumenau's paragraph 76). Mashayekhi and Umberger do not expressly disclose the claim's details of restarting subresource. However, Aditya further discloses a retry mechanism and apparatus including retrying sending data at lower layer level (Aditya's column 2 lines 5-27). It would have been obvious to one of ordinary skill in the art at the time of invention to include the retry mechanism and apparatus as suggested by Aditya in Mashayekhi's system such that the retry can be done for data transferring at a lower level in an efficient manner (i.e. transmitting frames at physical layer;

Claim 14 rejected based on the same rationale as in the rejection of claim 1.

Claim 15 rejected based on the same rationale as in the rejection of claim 2.

Claim 16 rejected based on the same rationale as in the rejection of claim 4.

Claim 17 rejected based on the same rationale as in the rejection of claim 6.

Claim 18 rejected based on the same rationale as in the rejection of claim 7.

Claim 19 rejected based on the same rationale as in the rejection of claim 8.

Claim 20 rejected based on the same rationale as in the rejection of claim 10.

Claim 21 rejected based on the same rationale as in the rejection of claim 9.

Claim 23 rejected based on the same rationale as in the rejection of claim 12.

Response to Arguments

The applicant's amendments and remarks filed 2/12/07 have been fully considered but they are not persuasive. Therefore, the rejections from the previous office action are respectfully maintained, with changes as needed to address the amendments.

Regarding Applicant's remarks on pages 6-9,

A) Blumenau's discloses the state information, for example a counter to keep track the pending requests on a particular location such that these requests can be recovery in an efficiently manner (see Blumenau's paragraph 41. pending i/o requests). Blumenau further teaches the state information can reside in host or any other area, such as storage system, switch or nay other system (see Blumenau's paragraph 56 lines 11-15).

B) Blumenau does not expressly disclose the amended limitation directing to the retry of the write request. However, Aditya discloses a retry mechanism and apparatus including in response to the receiving server failing to receive data sent from the sending server, the sending server retries/sends data again to ensure the request 's data is propagated to the receiving server (Aditya's column 2 lines 7-26). It would have been obvious to one of ordinary skill in the art at the time of invention to include the retry mechanism and apparatus as suggested by Adiya in Mashayekhi's system such that the retry can be done for data transferring at a lower level in an efficiently manner (i.e transmitting frames at physical layer; Aditya's column 4 lines 27-48),

thereby further improve the overall data throughput of the system (Aditya's column 3 lines 60-65).

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP 706.07(a). Applicant is reminded of the extension of time policy as set forth in 36 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

When responding to the office action, Applicant is advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Duc T. Doan whose telephone number is 571-272-4171. The examiner can normally be reached on M-F 8:00 AM 05:00 PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung S. Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


HYUNG SOUGH
SUPERVISOR
3-19-07